

Appl. No. : 10/648,009
Filed : August 25, 2003

AMENDMENTS TO THE SPECIFICATION

Please amend the specification as follows:

[0014] Hence, from the foregoing, it will be appreciated that there is a need for low-cost synthetic microspheres with properties similar to those of ~~natural~~ microspheres harvested from fly ash. There is also a need for synthetic microspheres with acceptable chemical durability suitable for incorporation into fiber cement compositions. To this end, there is a particular need for a low-cost, high yield process of producing synthetic microspheres from commonly available raw materials. It is an object of the present invention to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

[0022] In one embodiment, the building material further comprises one or more fibers in the cementitious matrix. Preferably, at least one of the fibers is cellulose fibers. Additionally, the building material can also comprise a hydraulic binder. In one embodiment, the microspheres incorporated in the building material comprise an aluminosilicate material. In another embodiment, the building material further comprises ~~natural~~ cenospheres derived from coal combustion wherein the average particle diameter of the ~~natural~~ cenospheres derived from coal combustion is substantially equal to the average particle size of the synthetic microspheres. The building material can comprise a pillar, a roofing tile, a siding, a wall, or various other types of building materials.

[0023] From the foregoing, it will be appreciated that certain aspects of the preferred embodiments provide a building material that incorporates synthetic microspheres that are substantially chemically inert and dimensioned to be used as a substitute for ~~natural harvested~~ cenospheres derived from coal combustion. In particular, in certain embodiments, the synthetic microspheres can be used as a low density additive and/or filler material for the building material. These synthetic microspheres can be advantageously incorporated in a cementitious matrix such as a fiber cement building product. These and other objects and advantages of the preferred embodiments of the present invention will become more apparent from the following description taken in conjunction with the following drawings.

[0024] Reference will now be made to the drawings wherein like numerals refer to like parts throughout. As described hereinbelow, the preferred embodiments of the present invention provide a chemically durable, synthetic microsphere having properties and

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characteristics similar to ~~natural~~ cenospheres derived from coal combustion ~~harvested from fly-ash~~. The preferred embodiments also provide a method for manufacturing the microspheres, including raw material composition and processing, and uses for the microspheres in various applications, including fiber cement products.

[0086] However, in certain embodiments, the synthetic microspheres can be manufactured with properties that are superior to that of ~~harvested~~ cenospheres derived from coal combustion. For example, in some embodiments, the average aspect ratio of the synthetic microspheres is closer to 1 than the average aspect ratio of ~~natural~~-cenospheres derived from coal combustion, thus providing a microsphere that is more spherical. Moreover, in some embodiments, the average standard deviation of the wall thickness of the synthetic hollow microspheres is less than that of cenospheres derived from coal combustion, which provides a product with a more uniform appearance. These improved properties are achieved through controlling the processing conditions and raw material in manufacturing the microspheres.

Abstract of the Disclosure

A building product incorporating synthetic microspheres having a low alkali metal oxide content is provided. The synthetic microspheres are substantially chemically inert and thus a suitable replacement for ~~natural~~-cenospheres derived from coal combustion, particularly in caustic environments such as cementitious mixtures. The building product can have a cementitious matrix such as a fiber cement product. The synthetic microspheres can be incorporated as a low density additive and/or a filler for the building product and/or the like.